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December 20, 1956

Progress Report

RD85 Task 2

RT-11C Transmitter) RS-11 Station

RR-11C Receiver)

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RT-11C Transmitter

A prototype RT-11C Transmitter has been constructed and tested. The design layout follows closely to the RT-11B Transmitter. The frequencies covered are 4-8 megacycles and 8-16 megacycles in two bands. Two 1AD⁴ subminiature pentodes are used in the crystal oscillator circuit. The 1AD⁴'s are wired in parallel to provide sufficient drive to the 2-5A6 power amplifier tubes. The oscillator circuitry is a modified pierce circuit using CR-18/U crystals in fundamental or second harmonic type of operation. The circuit is made to oscillate between the screen grid and control grid of the 1AD⁴'s and the plate tank circuit is tuned to the desired fundamental or second harmonic frequency.

The same printed circuitry layout used in the "A" and "B" Transmitters is used along with a separate printed board incorporating the oscillator circuitry as in the "B" transmitter. The plate tank condensers are identical to those used in the "A" transmitter oscillator and final amplifier. Similar harmonic rejection filters are incorporated in this unit as were used in the "A" and "B" transmitters. A parallel type of resonant trap circuit is used in the plate circuit of the power amplifier and a series trap to ground is used in the antenna circuit along with a series coil for high frequency suppression. The new key click filter designed for the "A" and "B" transmitters using the Stoddard field intensity equipment as a test indicator is also incorporated in this transmitter.

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The average power output is approximately 6 watts which is comparable to the "A" and "B" transmitter. The neon bulb side tone oscillator, the "hi-lo" power switch and the lamp bulb antenna current indicator are all incorporated in this unit. The reduction to approximately one-half power via the "hi-lo" power switch is accomplished by disconnecting the filament of one of the 5A6 amplifiers and inserting a larger screen resistor in the other 5A6 amplifier tube.

RR-11C Receiver

A prototype RR-11C receiver has been constructed and tested. The design layout follows closely to the RR-11A receiver. The unit incorporates 7 tubes and one crystal diode using three different tube types as follows:

1AD-4	-	R.F. Amplifier
1C8	-	Mixer
1AD4	-	Local Oscillator
1AK4	-	1st IF Amplifier
1AK4	-	2nd IF Amplifier
TG9 crystal diode	-	AM Detector
1AK4	-	BFO
1AD4	-	Audio Output

A thorough investigation of R.F. Amplifier circuit Q for maximum image rejection of the range of frequencies involved resulted in the use of the 3-gang precision condenser used in the "A" receiver. The image rejection of this receiver is approximately 50 db on the low band and 40 db on the high band. The receiver sensitivity averaged 6 microvolts on the low band and 8 microvolts on the high band. The new dial drive design is now being incorporated into this receiver. A sample of this design is being tested in the customer's laboratory at the present time. This new dial drive uses flanged rollers at each corner of the receiver frame. The flanges prevent a motion in the vertical plane as the dial tape moves around the periphery of the box. The drive mechanism itself is designed so that at least three sprocket teeth engage the dial tape at all times. These new features have definitely prevented tape slippage under our observations.

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We are currently investigating with the help of a ink manufacturer experienced in ink for polyester materials, a solution which will permanently bond to the mylar dial tape. Indications are that we will be supplied with an ink that will not flake on otherwise come off the mylar film.

The RR-11C receiver covers 4-8 megacycles and 8-16 megacycles in two bands. It is expected that the four RS-11C stations will be delivered very shortly after the approval and delivery of the

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